D 50604 (Pages : 3) Name.....

Reg. No.....

FIFTH SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2018

(CUCBCSS—UG)

Open Course

MAT 5D 18—MATHEMATICS FOR NATURAL SCIENCES

Time : Two Hours Maximum : 40 Marks

Section A

Answer all the **six** *questions.*
Each question carries 1 *mark.*

1. Define continuous and discrete variable with an example.
2. Find the arithmetic mean of the numbers 8, 3, 5, 12 and 10.
3. What do you mean by the mode of a set numbers.
4. Find the harmonic mean of the numbers 2, 4 and 8.
5. Define mean deviation of set of N numbers.
6. Convert the natural logarithm ln 13 = 2.56495 into equivalent natural exponential form.

(6 × 1 = 6 marks)

Section B

Answer any **five** *out of seven questions.*
Each question carries 2 *marks.*

7. Solve the equations $3a + 2b + 5c = 15$; $7a - 3b + 2c = 52$; $5a + b - 4c = 2$ simultaneously.
8. Out of 100 numbers, 20 were 4's , 40 were 5's, 30 were 6's and the remainder were 7's. Find the arithmetic mean of the numbers.
9. Prove that the sum of the deviations of $X_1, X_2, ..., X_N$ from their mean $\bar{X}$ is equal to zero.
10. If (a) 85 and (b) 150 numbers are arranged in an array, how would you find the median of the numbers.
11. Find the standard deviation s of each set of numbers 9, 3, 8, 8, 9, 8, 9, 18.
12. Prove that the standard deviation $s = \sqrt{\frac{\Sigma X^2}{N} - \left(\frac{\Sigma X}{N}\right)^2}$.
13. Find the second and third, moments of the set 2, 3, 7, 8, 10.

(5 × 2 = 10 marks)

Turn over

Section C

Answer any **three** *out of five questions.*
Each question carries 4 marks.

14. Solve the logarithmic equation $\log (6y - 7) + \log y = \log 5$.

15. The smallest of 150 measurements is 5.18 in, and the largest is 7.44 in. Determine a suitable set of (a) class intervals, (b) class boundaries, and (c) class marks that might be used in forming a frequency distribution of these measurements.

16. Using table given below, find the mean wage of the 70 employees at the P&R Company :

Wages	Frequency
250.00 - 259.99	8
260.00- 269.99	10
270.00 - 279.99	16
280.00 - 289.99	15
290.00 - 299.99	10
300.00 - 319.99	8
320.00 - 379.99	3
	Total = 70

17. Find the 10 – 90 percentile range of the heights of the students at XYZ University :

Height (in)	Number of Students
60-62	5
63-65	18
66-68	42
69-71	27
72-74	8
	Total = 100

18. The bacterial count in a certain culture increased from 1000 to 4000 in 3 days. What was the average percentage increase per day ?

(3 × 4 = 12 marks)

Section D

Answer any **two** *out of three questions.*
Each question carries 6 *marks.*

19. The numbers $X_1, X_2, ..., X_K$ occur with frequencies $f_1, f_2, ..., f_k$, where $f_1 + f_2 + ... + f_k = N$ is the total frequency.

    (1) Find the geometric mean G of the numbers.

    (2) Derive an expression for log G.

    (3) How can the results be used to find the geometric mean for data grouped into a frequency distribution ?

20. Find Pearson's (a) first ; and (b) second coefficients of skewness for the wage distribution of the 65 employees at the P&R Company :

Wages	Frequency
250.00 - 259.99	8
260.00 - 269.99	10
270.00 - 279.99	16
280.00 - 289.99	14
290.00 - 299.99	10
300.00 - 309.99	5
310.00 - 319.99	2
	Total = 65

21. A car travels 25 miles at 25 miles per hour (mi/h), 25 miles at 50 mph, and 25 miles at 75 mph. Find the arithmetic mean of the three velocities and the harmonic mean of the three velocities. Which is correct ?

(2 × 6 = 12 marks)